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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/601,310	07/31/2000	Sang-young Lee	202021/140	9736

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EXAMINER	
BERMAN, SUSAN W	
ART UNIT	**PAPER NUMBER**
1711	10

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Please find below and/or attached an Office communication concerning this application or proceeding.

8W

Office Action Summary	Application No.	Applicant(s)
	09/601,310	LEE ET AL.
	Examiner	Art Unit
	Susan W Berman	1711

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 June 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9,15 and 17-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,15,17-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 9 .

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: .

Response to Amendment

The rejections under 35 USC 112, second paragraph set forth in paper number 6 are withdrawn in response to Amendment A, filed 06-18-2002.

Response to Arguments

Applicant argues that Machi et al do not teach the method set forth in instant claim 1. This argument is not persuasive because Machi et al disclose a process for production of a separator comprising irradiating a polyolefin with ionizing radiation, such as electron beam, at a dose rate of 5×10^4 to 10^7 rads/sec. in vacuum or in inert gas and contacting the irradiated film with an aqueous monomer solution to obtain a grafted film. See column 2, line 46, to column 3, line 46. Machi et al teach irradiation with ionizing radiation in a vacuum, which are the conditions set forth in the claims and in the specification for changing the pore size and shape of the polymer film.

Applicant argues that the cited references do not teach a method effective to change pore size and shape of the polymer membrane being irradiated. This argument is not found persuasive with respect to claim 1 because the method recited requires irradiating ionic particles of the surface of the polymer membrane under vacuum condition and does not recite what, if any, other conditions are required to change pore size and shape of the polymer membrane. The specification discloses irradiation under vacuum conditions and that the type of ion and nature of irradiation can effect a change in pore size or shape of the polymer membrane. The cited references teach irradiating the surface of a polymer with energized ionic particles under vacuum conditions, therefore, the methods disclosed by the cited prior art would be expected to provide the same effects as set forth in the instant claims, whether explicitly described in the prior art or not. There is no evidence of record to show that the prior art methods would not produce a change in pore size and/or shape of the surface of the polymer being irradiated.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3, 20 and 23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claims 3 and 20, electrons are included in the group of ion generating gases; however, electrons are not gases and do not produce ions. Electrons are charged particles but they are not ionic particles. Ionic particles are electrically charged atoms, radicals or molecules. Alternatively, applicant could replace "ionic particles" with "electrically charged particles". See the discussion of IBEST and EBEST in the Stinnett et al references. Claim 23 recites "high vacuum of step (b)" in claim 15; however, claim 15 recites "high vacuum" in step (a), not in step (b).

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-6 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Machi et al (4,376,794). Machi et al disclose a process for production of a separator comprising irradiating a polyolefin film with ionizing radiation, such as electron beam, at a dose rate of 5×10^4 to 10^7 rads/sec. and contacting the irradiated film with an aqueous monomer solution to obtain a grafted film. Irradiation can be carried out in vacuum or in inert gas. See column 2, line 46, to column 3, line 46. Machi et al teach irradiation with ionizing radiation in a vacuum, which are the conditions set forth in the claims and in the specification for changing the pore size and shape of the polymer film. Therefore, the prior art disclosed method would be expected to change the pore size and shape of the polymer film in the absence of evidence to the contrary.

Claims 1-5, 9, 15, 17, 19, 20, 23, 26 and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Urairi et al (5,282,965). Urairi et al disclose treating the surface of a PTFE porous membrane with a low temperature plasma to render the surface hydrophilic. The treatment can take place at low gas pressure from 0.01 to 10 torr. Applicant discloses "high vacuum" from 10^{-2} to 10^{-8} torr on page 8. See column 2, lines 33-45. The pressure in Example 1 is 0.02 torr. Urairi et al teach irradiation with ionizing radiation in a vacuum, which are the conditions set forth in the claims and in the specification for changing the pore size and shape of the polymer film. Therefore, the prior art disclosed method would be expected to change the pore size and shape of the polymer film in the absence of evidence to the contrary. There is no evidence of record to show that the presence of the reactive gas would inhibit changing the pore size and shape of the polymer film during plasma treatment (positive ions and electrons in the plasma irradiated onto the surface of the polymer at low gas pressure). Claims 15 and 31 are interpreted to encompass the disclosed method of irradiating a plasma in the presence of a gas species since the reactive gas would be expected to react with the plasma treated surface of the polymer.

Claims 1-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Karakelle et al (4,885,077). Karakelle et al disclose coating a polymeric membrane with a monomer solution and treating the coated membrane in a plasma generator. The reaction camber is evacuated and then a gas is fed into the chamber, thus increasing the gas pressure before treating the membrane with the plasma. Karakelle et al teach gas pressures from 0.1 to 100 torr, which would provide a vacuum. See column 5, lines 22-52, column 6, lines 7-11, and the Examples. Karakelle et al teach that the plasma irradiation polymerizes the acrylic monomer on the surface of the membrane, however, the plasma treatment would also be expected to change the pore size and shape of the polymer film since Karakelle et al teach treatment under vacuum conditions, as required in the claims. There is no evidence of record to show that the presence of the monomer solution would inhibit changing the pore size and shape of the polymer film during plasma treatment (positive ions and electrons in the plasma irradiated onto the surface of the polymer at low gas pressure).

Claims 1-6, 15, 17-20, 23, 24 and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Ohnishi (5,028,332). Ohnishi discloses forming a hydrophilic material by subjecting the surfaces of a polymer to a plasma treatment. The Examples teach plasma treatment at an argon pressure such as 0.1 torr in order to provide radicals on the surface of the polymer, reducing the pressure to 0.01 torr or below and then graft polymerizing a hydrophilic monomer in gas phase.

Ohnishi teaches irradiation with ionizing radiation in a vacuum, such as 0.1 torr that is then reduced to 0.01 torr or below, which method appears to provide the conditions set forth in the claims and in the specification for changing the pore size and shape of the polymer film. Therefore, the prior art disclosed method would be expected to change the pore size and shape of the polymer film, in the absence of evidence to the contrary.

Claims 1-3, 6, 8, 15, 17-20, 23, 24, 27 and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Masuoka et al (4,845,132). Masuoka et al disclose production of a hydrophilic porous membrane by irradiating a hydrophobic porous membrane with plasma in the presence of a hydrophilic monomer in gaseous state. Plasma irradiation takes place under a vacuum, within the range of 10^{-3} to 10 torr (column 7, lines5-10). The graft polymerization is carried out under pressure in the range from 10^{-2} to 10^{4} Torrs. See column 6, lines 37-42, column 6, line 58, to column 8, line 23. Masuoka et al teach plasma irradiation under a vacuum, therefore, the disclosed method to activate the surface would be expected to change the pore size and shape of the polymer, in the absence of evidence to the contrary.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-5, 9, 15-26 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Korean Laid-Open Patent Publication No. 96-37742, as discussed on page 4 of the specification, in view of Machi et al. Publication No. 96-37742 discloses a process for modifying the surfaces of a polymer by irradiating energized ion particles onto the surfaces of the polymer under vacuum while blowing a reactive gas directly over the surface of the polymer to decrease the wetting angle of the surface. See page 4, lines 5-14. Korean publication 96-37742 teaches irradiation with ionizing radiation in a vacuum, which method appears to provide the conditions set forth in the claims and in the specification for changing the pore size and shape of the polymer film. Therefore, the disclosed method would be expected to change the pore size and shape of the polymer film, in the absence of evidence to the contrary. The discussion of the publication in the specification does not specifically mention treating polymer membranes, polyolefin blends or laminates.

Machi et al teach that a polyolefin polymeric membrane can be treated with ionizing radiation in analogous art. See the discussion of the reference set forth above. It would have been obvious to one skilled in the art to employ the polymers in the form of polymeric membranes, as disclosed by Machi et al in an analogous process, as the polymer to be treated in the process disclosed by Korean Publication '742. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of success in providing a useful membrane.

Claims 1-6, 9, 15, 17, 19-27 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jung et al (5,965,629) in view of Machi et al. Jung et al disclose a process for modifying the surfaces of a polymer by irradiating energized ion particles onto the surfaces of the polymer under vacuum while blowing a reactive gas directly over the surface of the polymer to decrease the wetting angle of the surface. See column 4, line 39, to column 7, line 49, and Examples 1-3. Jung et al teach that irradiating ion particles onto the polymer surface changes the topography of the surface. The disclosed treatment would be expected to change the pore size of the polymer film since Jung et al teach treatment under vacuum conditions, as required in the instant claims. There is no evidence of record to show that the presence of the reactive gas blowing across the surface would inhibit changing the pore size and shape of the polymer film during irradiation treatment. Jung et al do not specifically mention treating polymer membranes, polyolefin blends or laminates.

Machi et al teach that a polyolefin polymeric membrane can be treated with ionizing radiation in analogous art. See the discussion of the reference set forth above. It would have been obvious to one skilled in the art to employ the polymers in the form of polymeric membranes, as disclosed by Machi et al in an analogous process, as the polymer to be treated in the process disclosed by Jung et al. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of success in providing a useful membrane.

Claims 1-6, 9, 15, 17, 19-27 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koh et al (5,783,641) in view of Machi et al. Koh et al disclose a process for modifying the surfaces of a polymer by irradiating energized ion particles onto the surfaces of the polymer under vacuum while blowing a reactive gas directly over the surface of the polymer to decrease the wetting angle of the surface. See column 4, line 19, to column 7, line 50, and Examples. Koh et al teach that irradiating ion particles onto the polymer surface changes the topography of the surface. The disclosed treatment would also be expected to change the pore size of the polymer film since Koh et al teach treatment under vacuum conditions, as required in the claims. There is no evidence of record to show that the presence of the reactive gas blowing across the surface would inhibit changing the pore size and shape of the polymer film during irradiation treatment. Koh et al do not specifically mention treating polymer membranes, polyolefin blends or laminates.

Machi et al teach that a polyolefin polymeric membrane can be treated with ionizing radiation in analogous art. See the discussion of the reference set forth above. It would have been obvious to one skilled in the art to employ the polymers in the form of polymeric membranes, as disclosed by Machi et al in an analogous process, as the polymer to be treated in the process disclosed by Koh et al. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of success in providing a useful membrane.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Korean Laid-Open Patent Publication No. 96-37742, as discussed on page 4 of the specification, Jung et al (5,965,629) or Koh et al (5,783,641), each in view of Machi et al, as appplied to claim 1 above, and further in view of Lazear (4,346,142). None of the primary references nor Masuoka et al mention the method of manufacturing the porous membrane to be treated.

Lazear discloses a microporous polyolefinic film prepared by cold and/or hot stretching or by wet stretching that is then rendered hydrophilic by exposing the surface to about 1 to about 10 megarads of ionizing radiation. It would have been obvious to one skilled in the art to employ a microporous film prepared by hot and/or hot stretching or by wet stretching, as taught by Lazear for use in an analogous method, in the method for producing a hydrophilic porous membrane disclosed by Masuoka et al. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of success because Masuoka et la teach starting with a porous membrane having pore diameters in the range from 0.05 micrometers to 1 micrometers and Lazear teaches an average pore size from about 200 to about 10000 Angstroms thus providing the desired pore size fro the process of Masuoka et al as well.

Claims 1-7, 15-25 and 27-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masuoka et al (4,845,132). Masuoka et al disclose production of a hydrophilic porous membrane by irradiating a hydrophobic porous membrane with plasma in the presence of a hydrophilic monomer in gaseous state. Plasma irradiation takes place under a vacuum, for example at 0.1 Torr of argon gas (Examples). The graft polymerization is carried out under pressure in the range from 10^{-2} to 10^{4} Torrs. See column 6, lines 37-42, column 6, line 58, to column 8, line 23.

With respect to claims 4, 5, 21 and 22, It would have been obvious to one skilled in the art to determine the energy and dose of ion particles required to obtain the desired product from the teachings of Masuoka et al. With respect to claims 7 and 28, It would have been obvious to one skilled in the art to treat a blend of polyolefins since Masuoka et al teach that different kinds of polyolefins can be treated by the disclosed method. With respect to claim 25, It would have been obvious to one skilled in the art to determine the rate of infusion of gas required to obtain the desired energy and dose of ion particles and the desired product in the method disclosed by Masuoka et al.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Machi et al or Masuoka et al (4,845,132) in view of Lazear (4,346,142). The disclosures of Machi et al and Masuoka et al are discussed above. Each references discloses treating polyolefins. Machi et al nor Masuoka et al mention the method of manufacturing the polyolefin membrane to be treated.

Lazear discloses a microporous polyolefinic film prepared by cold and/or hot stretching or by wet stretching that is then rendered hydrophilic by exposing the surface to about 1 to about 10 megarads of ionizing radiation. It would have been obvious to one skilled in the art to employ a microporous film prepared by hot and/or hot stretching or by wet stretching, as taught by Lazear for use in an analogous method, in the method for producing a hydrophilic porous membrane disclosed by Masuoka et al. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of success because Masuoka et la teach starting with a porous membrane having pore diameters in the range from 0.05 micrometers to 1 micrometers and Lazear teaches an average pore size from about 200 to about 10000 Angstroms thus providing the desired pore size fro the process of Masuoka et al as well.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Machi et al. Machi et al teach treating polyolefin films, but do not mention polyolefin blends or laminates. It would have been obvious to one skilled in the art to substitute a polyolefin blend or a polyolefin laminate for the polyolefin film discussed by Machi et al in the method disclosed by Machi et al. One of ordinary skill in the art at the time of the invention would have expected the method to be successful and to produce an equivalent product since the polyolefin blend or laminate would be expected to be modified by irradiation in a vacuum in the same manner as the polyolefin film disclosed, in the absence of evidence to the contrary.

Claim 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masuoka et al (4,845,132). Masuoka et al teach treating polyolefin porous membranes, but do not mention polyolefin blends or laminates. It would have been obvious to one skilled in the art to substitute a polyolefin blend or a polyolefin laminate for the polyolefin film discussed by Masuoka et al in the method disclosed by Masuoka et al. One of ordinary skill in the art at the time of the invention would have expected the method to be successful and to produce an equivalent product since the polyolefin blend or laminate would be expected to be modified by irradiation in a vacuum in the same manner as the polyolefin film disclosed, in the absence of evidence to the contrary

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Susan Berman whose telephone number is (703) 308-0040.

The fax number for this group is (703) 872-9310 or, for submissions after Final Rejection, (703) 872-9311.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist at telephone number (703) 308-0661.

Susan Berman

Susan Berman
Primary Examiner
Art Unit 1711

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7/25/02